

REMARKS

Favorable reconsideration of this Application as presently amended and in light of the following discussion is respectfully requested.

Claims 3, 5, 7, and 13 remain pending in this application. Claims 1, 2, 4, 6, 8-10, 11, 12, and 14-16 are canceled without prejudice or disclaimer. Claim 3 has been amended to incorporate canceled subject matter (Claim 4). No new matter has been added.

By way of summary, the Official Action of December 15, 2006 presents the following issues: Claims 3, 6, and 11 are rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu (U.S. Patent Publication No. 2002/0196764 A1) in view of Gehrman (U.S. Patent No. 6,912,657 B2); Claim 4 stands rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and Lockart et al. (U.S. Patent No. 6,229,806, hereinafter Lockart); Claims 5, 7, and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and O'Brien (U.S. Patent Publication No. 2004/0022931 A1); Claims 8 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and further Ocepek et al. (U.S. Patent No. 204/0049586, hereinafter Ocepek) and Ibi et al. (U.S. Patent Publication No. 2003/0118189 A1, hereinafter Ibi); Claim 9 stands rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and further Ocepek, Ibi, and Meier (U.S. Patent No. 6,847,620); Claim 10 stands rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and further Meier, Ibi, and Ocepek; Claims 12 and 14 stand rejected under 35 U.S.C. §103 as being unpatentable over Shimizu in view of Gehrman and further Nuutinen (U.S. Patent Publication No. 2002/0129236 A1); and, Claim 15 stands rejected under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and further Ocepek, Ibi, and Meier.

As Applicant has canceled Claims 1, 2, 4, 6, 8-10, 11, 12, and 14-16 Applicant respectfully submits that the rejections pertaining to these claims have been rendered moot. Furthermore, with respect to the rejection of Claim 3, as Applicant has amended Claim 3 to incorporate the subject matter of canceled Claim 4, Applicant respectfully submits that the rejection of Claim 3 noted above has also been rendered moot. As such, Applicant will address rejections noted above which relate to Claim 4 and pending Claims 5, 7, and 13 as the only currently outstanding rejections.

REJECTION UNDER 35 U.S.C. § 103

The outstanding Official Action has rejected Claim 4 under 35 U.S.C. § 103 as being unpatentable over Shimizu in view of Gehrman and Lockart. The Official Action states that Shimizu and Gehrman disclose all of the Applicant's claim limitations, with the exception of discarding a frame when an authentication header is not valid. The Official Action cites Lockart as disclosing this more detailed aspect of the Applicant's invention, and states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the cited references for arriving at the Applicant's claim. Applicant respectfully traverses the rejection.

Amended Claim 3 recites, *inter alia*, a terminal, including:

an ad-hoc key management list table having at least one key management list in which authentication header keys with respect to other terminals of an ad-hoc network are held in such a manner as to correspond to the terminal identifiers of said other terminals; . . .

a path table having at least one path list for holding a transfer destination terminal identifier for causing a frame to arrive at another terminal via terminals of the path list in such a manner as to correspond to the terminal identifier of the other terminal; and

means for searching said path table for said path list containing an end-point terminal identifier and transmitting

said frame to said transfer destination terminal identifier via terminals of the path list, when said authentication header is valid and the end-point terminal identifier of said frame is not the terminal identifier of the other terminal and for discarding said frame when said authentication header is not valid,

wherein the terminal and the other terminal's communicate directly, in an ad-hoc manner exclusive of any network access point. (emphasis added)

Shimizu describes a wireless LAN system. As shown in Fig. 1, access to Ethernet (5) is provided via access point (AP) (1). Stations (2) wishing to communicate with the Ethernet are channeled through the AP. Periodically, in order to manage access to the Ethernet, the AP provides beacon frames, including data for synchronization to each station (2). Each station, which has received a pertinent beacon, makes an authentication request to the AP at the time of starting communication and after receiving authentication permission for the AP.¹

In operation, the Shimizu stations (2) communicate with the AP (1) for clearing a public key management table (40) stored therein. Each terminal (2) includes its own AP data management table (50) for tracking successful authentication across a plurality of APs. As both the APs and stations (2) have their own confidential keys, public keys corresponding thereto, and user certificates with the public keys attached thereto, the stations (2) and the APs are able to participate in an authentication procedure, as outlined in Figs. 6-9.²

In a further embodiment, Shimizu describes a wireless LAN embodiment wherein stations (STA) communicate directly without use of an access point (AP).

Gerhrmann describes an ad-hoc communication network such as the bluetooth network or a wireless local area network (WLAN). In operation, a first device may authenticate a second device using a graphical string which is a public key.³

Lockart describes a packet data system in which packets which cannot be authenticated are discarded.⁴

¹ Shimizu at columns 33-36.

² Shimizu at paras. 55-67.

³ Gerhrmann at Figs. 2-3.

Conversely an exemplary embodiment of the Applicant's claimed advancement, as recited in amended Claim 3, a terminal is provided for supporting ad-hoc communication. An ad-hoc key management list table includes at least one key management list in which authentication header keys with respect to other terminals of an ad-hoc network are held in such a manner as to correspond to the terminal identifiers of the other terminals. The key management list is searched for a key management list entry containing a transmission terminal identifier of a received frame in order to extract the corresponding authentication header key. The authentication header of the frame is confirmed as valid by using the extracted authentication header key. A path table is provided having at least one path list for holding a transfer destination terminal identifier for causing a frame to arrive at another terminal via terminals of the path list, in such a manner as to correspond to the terminal identifier of the other terminal. The path table is searched for the path list containing an end-point terminal identifier. The frame is transmitted to the transfer destination terminal identifier via terminals of the path list when the authentication header is valid and the end-point terminal identifier of the frame is not the terminal identifier of the other terminal. The frame is discarded when the authentication header is not valid.

In this way, terminals of the ad-hoc network are able to relay data between destinations through a simple authentication procedure of header processing. There is no need to do full authentication processing between terminals including encryption and decryption.

The Official Action has cited paragraphs [0018], [0052]-[0056] and Figures 4 and 5 of Shimizu as describing multi-hop communication features, Applicant notes that these paragraphs simply describe the process by which a STA address is registered in a management table. Accordingly, even when Shimizu is modified by Lockart and Gerhrmann,

⁴ Lockart column 3, lines 40-42.

Shimizu only supports direct communication between terminals. However, Applicant's amended Claim 3 recites that a path table includes a path list for holding a transfer destination terminal identifier for causing a frame to arrive at another terminal (i.e., intermediate terminal) via terminals of the path lists in such a manner as to correspond to the terminal identifier of the other terminal. In other words, data forwarded to a destination terminal will arrive at a relay terminal as if addressed thereto. Furthermore, amended Claim 3 recites that the path table is searched for a path list containing an end point terminal identifier so that the frame can be transferred to the destination terminal identifier via terminals of the path list when the authentication header is valid and the end point terminal identifier of the frame is not the terminal identifier of the other terminal (i.e., the data is not meant to be sent to the relay terminal as the destination). As none of the cited references alone or in combination describe or suggest this feature Applicant respectfully requests that amended Claim 3 is patentably distinguished over the cited combination of references.

The outstanding Official Action has rejected Claims 5, 7, and 13 under 35 U.S.C. § 103 as being unpatentable over Shimizu and Gehrman in view of O'Brien. The Official Action contends that Shimizu and Gehrman disclose all of the Applicant's claim features, with the exception of decrypting the payload of a frame by using an extracted unicast encryption key. However, the Official Action cites O'Brien as disclosing this more detailed aspect of the Applicant's claimed advancements, and states that it would have been obvious to one of ordinary skill in the art at the time the advancements were made to combine the cited references for arriving at the Applicant's claims. Applicant respectfully traverses the rejection.

As noted above, the Shimizu and Gehrman references describe direct communication between two devices. O'Brien is merely cited for the feature of decrypting data with a unicast key. However, none of these references either alone or in combination

recite that a key management list is searched in accordance with a start point terminal identifier and/or an end-point terminal identifier in order to identify the uni-cast encryption key. In other words, as above these claims embrace a multi-hop path for conveying the frame. As none of the cited references alone or in combination disclose this feature, Applicant respectfully requests that the rejection of Claims 5, 7 and 13 under 35 U.S.C. §103 be withdrawn.

CONCLUSION

Consequently, in view of the foregoing remarks, it is respectfully submitted that the present Application, including Claims 3, 5, 7 and 13, is patently distinguished over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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